Flight Opportunities Program Status

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Rationale for the Program—The 100km View . . .

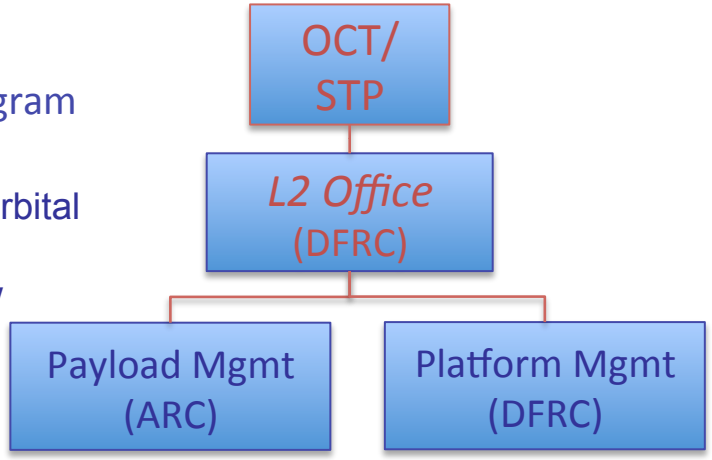
To facilitate maturation of cross-cutting space technologies for NASA's **Space Technology Program . . .**

. . . while achieving a goal of the **National Space Policy*** to "Encourage and Facilitate" the growth of the U.S. commercial space industry

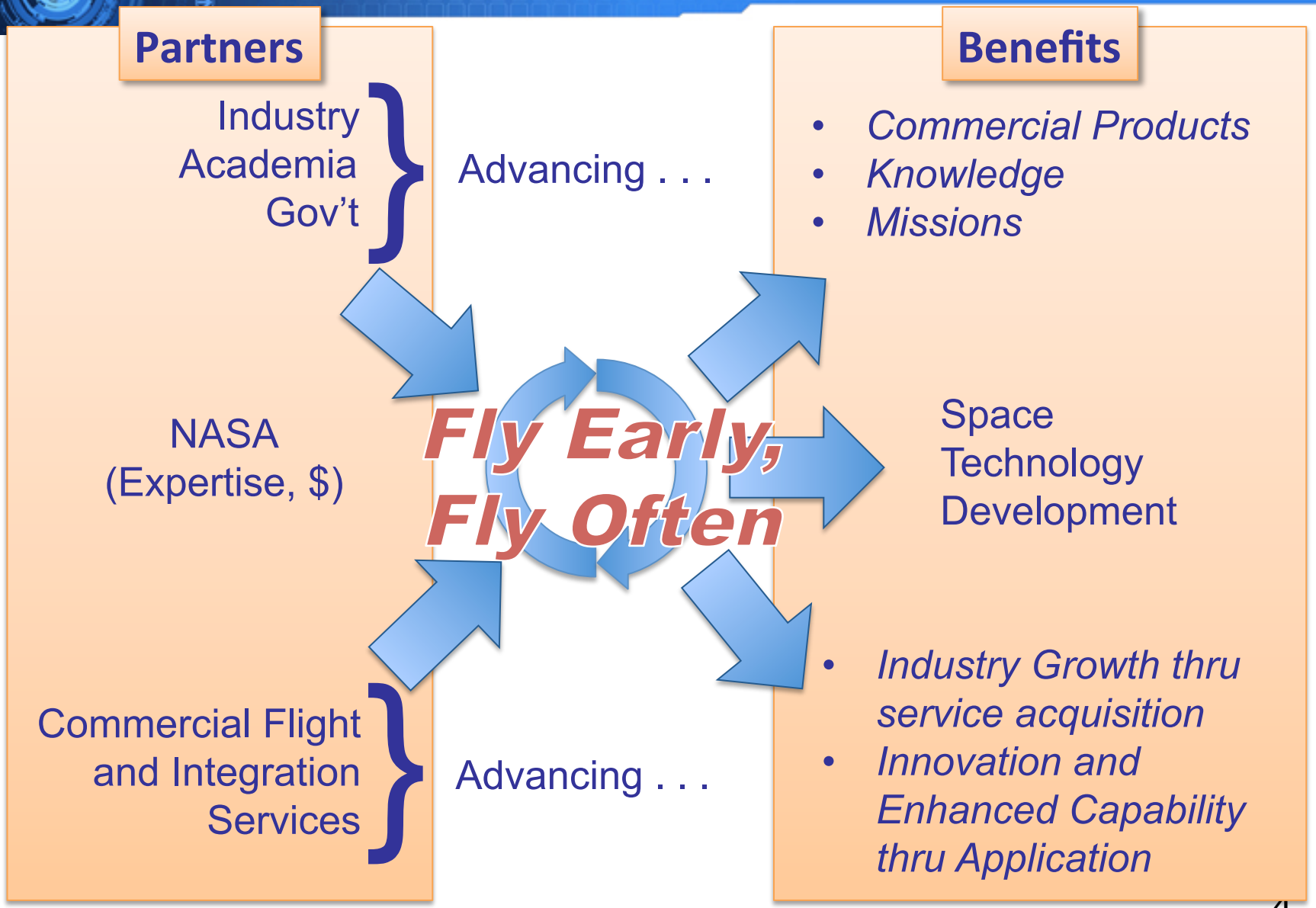
* http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf

Program Impetus, Goals, and Implementation . . .

- **Program Impetus**
  - Commercial Reusable Suborbital Research (CRuSR) as part of Space Technology Program Mandated by Congress (Sec 907 NASA Auth. Act of 2010)
  - Continuation of NASA Innovative Partnerships FAST Parabolic Program
  - *Fly early, Fly often.* Bridge the gap between testing space technology in a laboratory environment and demonstrating it in a mission-relevant operational environment
- **Program Goals**
  - Facilitate the maturation of technology payloads to higher TRL's through flights in relevant environments
  - Foster growth in the emerging commercial suborbital platform industry
- **Implementation**
  - Established under the OCT/Space Technology Program
  - Managed by DFRC
    - 60+ years of high-speed, rocket-powered suborbital flight heritage
    - Proven Airworthiness and Flight Safety Review process



The Value Proposition . . .



Program Supply and Demand . . .

- **Demand**—*where do payloads come from? . . .*
  - Users: Industry, Academia, Gov't
  - FOP's Announcement of Flight Opportunities
  - Space Technology Program activities
    - Game Changing Development Program's NASA Research Announcement (NRA): "Technology Development for Suborbital Flight Opportunities"
  - Other Mission Directorates
    - NASA SMD's Research Opportunities in Space and Earth Sciences (ROSES)
    - NASA SMD's Hands On Project Experience (HOPE)
- **Supply**—*where do flight opportunities come from? . . .*
  - The emerging commercial suborbital transportation industry (primary)
  - NASA suborbital program platforms (if required)

Demand—Announcement of Flight Opportunities . . .

- Announce Opportunities for Parabolic Flights and sRLV Flights, including dev. flights
- Released on December 21, 2010; Open Call until December 31, 2014
- Hosted on NSPIRES
  - http://flightopportunities.nasa.gov/afo
  - Evaluation criteria
    - Applicability to OCT Technology areas (Roadmaps)
    - Risk reduction
    - Current TRL
    - Benefit to OCT (Demonstration & Transition)
    - Readiness to fly
    - Experience of team
  - Awarded as unfunded Space Act Agreements or MOA's
- Round #1 Payloads: 12 Parabolic, 2 sRLV, and 2 Both
- Round #2 Payloads: 4 Parabolic, 4 sRLV, and 1 Both
- Round #3 Closed December 15, 2011; 35 proposal submitted; Selection expected early Mar 2012

Next Opportunity Window Opens in Mar 2012

Demand—NASA Research Announcement . . .

- Drivers
  - "Prime the Pump" to ensure technology payloads are available as sRLV flights come online
  - Promote suborbital research through enhanced capabilities on commercial platforms
- Two Topic Areas:
  - Topic 1: Payloads to Develop Space Technologies
  - Topic 2: Vehicle Capability Enhancements and Onboard Research Facilities for Payload Accommodation
- Total Investment: approx. $3.5M
  - Topic 1: Up to 15 awards ranging from $50k to $125k each; Up to 5 awards ranging from $125k to $500k each
  - Topic 2: Up to 5 awards NTE $500k each
- Timeline
  - NRA released Feb 10, 2012
  - Notice of Intent to Propose due Mar 10, 2012
  - Proposals due Mar 26, 2012

NRA can be accessed at:
http://go.usa.gov/U9G

Developed Payloads Ready for Flights in 2013

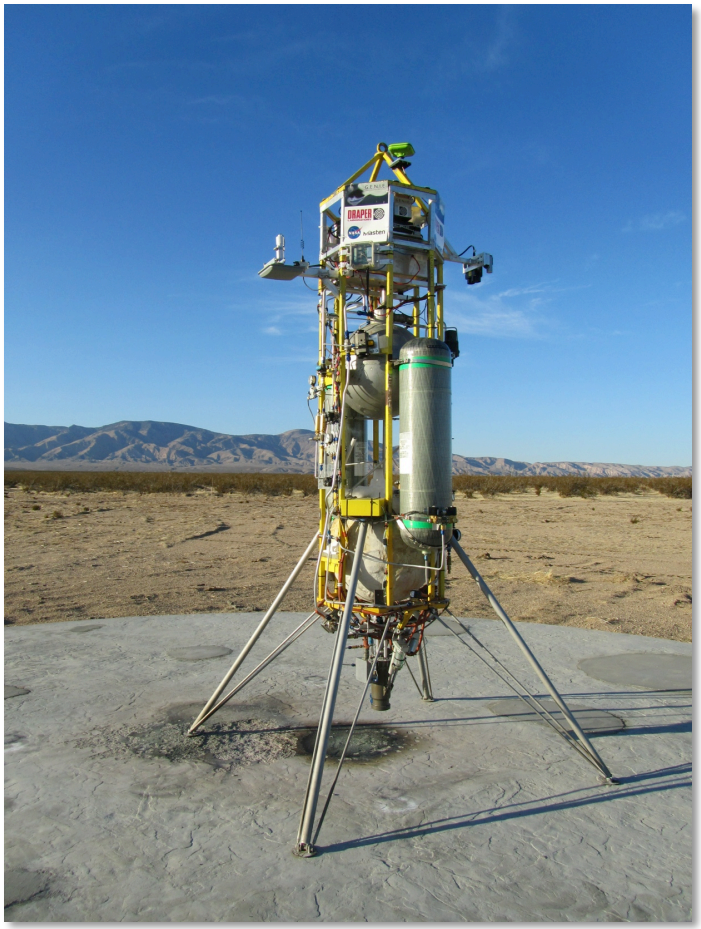
Demand—NRA Technology Areas . . .

- **Topic 1 Technology Areas:**
  - Microfluidic Systems for Small Spacecraft Propulsion
  - Microgravity Fluid Systems for In-space Propellant Management and Storage
  - Microgravity Fluid Systems for Spacecraft Fuel Cells
  - Miniaturized Attitude Control Systems for Small Spacecraft
  - Thermal Control Systems; Remote Sensing Instruments and Observatories, and Sensor Systems
  - Large Aperture Deployable Systems
  - Planetary Autonomous Landing
  - and Hazard Avoidance Systems
- **Topic 2 Technology Areas**
  - External Instrument Booms
  - Instrument Pointing, Tracking, and Stabilization Systems
  - Deployment Capabilities for Dedicated Small Satellite Launch
  - Biological Facilities
  - Deployment and Metrology Facilities
  - Microgravity Vibration Isolation Facilities

Supply—Utilization of Commercial Supply . . .

- Utilize the Zero-G Corp parabolic platform through JSC's Reduced Gravity Office
- Late Spring 2011, solicited proposals for flight and payload integration from commercial reusable space industry
  - Selected seven commercial providers in Aug 2012
    - Armadillo Aerospace, Heath, Texas
    - Near Space Corporation, Tillamook, Ore.
    - Masten Space Systems, Mojave, Calif.
    - Up Aerospace Inc., Highlands Ranch, Colo.
    - Virgin Galactic, Mojave, Calif.
    - Whittinghill Aerospace LLC, Camarillo, Calif.
    - XCOR, Mojave, Calif.
- Commercial Vertical Testbed (CVTB) development
  - Draper Labs, Cambridge, MA, tasked in Sept 2011 to rapidly develop a VTVL vehicle capability to allow for quick integration and demonstration of landing technologies

Questions?



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